

Application No. 09/832,178

Filed: April 10, 2001

TC Art Unit: 2633

Confirmation No.: 8822

REMARKS

The instant Amendment is filed in response to the official action dated February 26, 2004. Reconsideration is respectfully requested.

The status of the claims is as follows:

Claims 1-16 are currently pending.

Claims 1-16 stand rejected.

Claims 1, 7, and 13-16 have been amended.

Claims 2 and 8 have been canceled.

The Examiner has rejected claims 1-5, 7-11, and 13-16 under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al. (USP 6,512,613) in view of Kim et al. (USP application 2001/0015836). Specifically, the official action indicates that the Tanaka reference discloses the optical add/drop multiplexor of base claims 1 and 13, except for the optical signal de-interleaver. The official action further indicates that the Kim reference discloses a de-interleaver 200 (see Fig. 4 of Kim et al.), and that it would have been obvious to one of ordinary skill at the time the invention was made to combine the teachings of Tanaka et al. and Kim et al. The Applicants respectfully submit, however, that the official action does not take into account all of the limitations of amended claims 1 and 13, and therefore the

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rejections of amended claims 1 and 13 and the claims dependent therefrom under section 103 of the Patent Laws are unwarranted and should be withdrawn.

For example, the official action does not take into account the limitation that the optical signal de-interleaver has an architecture comprising a plurality of hierarchical levels with at least one optical signal de-interleaver module being disposed in each of the hierarchical levels, as recited in amended claims 1 and 13. The notion of providing an optical signal de-interleaver having a hierarchical arrangement of optical signal de-interleaver modules is described throughout the instant application, e.g., see page 14, lines 16-25, of the application. In one embodiment described in the instant application, the optical signal de-interleaver 106 includes a plurality of optical signal de-interleaver modules 116 and 118 disposed in a lower level, and a single optical signal de-interleaver module 114 disposed in an upper level, of the hierarchical arrangement (see Fig. 1c of the application).

The official action indicates that the Kim reference discloses at least one optical signal de-interleaver module disposed in each of a plurality of hierarchical levels comprising elements 200, 210, and 220 (see Fig. 4 of Kim et al.). The

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Applicants respectfully point out, however, that although the element 200 is described by Kim et al. as a de-interleaver, the elements 210 and 220 are not de-interleavers, but instead are described as respective multiplexors for multiplexing optical signals and for outputting the multiplexed signals to the input terminals of the de-interleaver 200 (see paragraphs 0020 and 0021 of Kim et al.).

The Kim reference further discloses that one or more multiplexors such as the multiplexor 220 is selectively connected to the input terminals of the de-interleaver 200 so as to extend the transmission capacity of the system (see paragraph 0021 of Kim et al.). Accordingly, the Kim reference not only fails to disclose a plurality of de-interleaver modules in a hierarchical arrangement, as recited in amended claims 1 and 13, but it also teaches away from what is described in the instant application.

For example, the instant application discloses that, because desired carrier wavelengths may be accessed at any level of the hierarchy comprising the de-interleaver modules 114, 116, and 118, the optical add/drop multiplexor 100 may be re-configured without having to install or remove individual modules, thereby reducing the cost of operating the system (see page 18, lines 10-18, and Fig. 1a, of the application). In contrast, one or more

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multiplexors must be selectively connected to the input terminals of the de-interleaver 200 to extend the transmission capacity of the Kim system (see paragraph 0021, and Fig. 4, of Kim et al.). As a result, the benefit of reducing operating costs by avoiding the need to install or remove individual modules in an optical add/drop multiplexor cannot be achieved via the system disclosed by Kim et al.

Another benefit of the optical add/drop multiplexor recited in amended claims 1 and 13 is that it can be easily designed to handle different wavelength spacings. For example, a device receiving the respective wavelengths  $\lambda_M$ ,  $\lambda_O$ ,  $\lambda_N$ , and  $\lambda_P$  provided by the de-interleaver 106 (see Fig. 1c of the application) may be designed for wavelengths with spacings of 400 GHz, and the optical add/drop module 102 (see Fig. 1a of the application) may be designed for wavelengths with spacings of 100 GHz. Accordingly, the optical add/drop module 102 may provide the wavelengths  $\lambda_M$ ,  $\lambda_N$ ,  $\lambda_O$ , and  $\lambda_P$  comprising the dropped traffic to the optical signal de-interleaver module 114 with the 100 GHz spacing, the optical signal de-interleaver module 114 may provide the respective even and odd groups of wavelengths to the optical signal de-interleaver modules 116 and 118 with a 200 GHz spacing, and the optical signal de-interleaver modules 116 and 118 may generate the respective

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wavelengths  $\lambda_M$ ,  $\lambda_O$ ,  $\lambda_W$ , and  $\lambda_P$  with the desired 400 GHz spacing (see page 16, lines 7-25, of the application).

In contrast, the Kim reference merely discloses that optically multiplexed channels with a constant interval are inputted through the input terminal of the interleaver 100, and then provided to the multiplexors 210 and 220 for subsequent de-interleaving by the de-interleaver 200 (see paragraph 0026, and Fig. 7, of Kim et al.). The Kim reference neither teaches nor suggests that a plurality of de-interleaver modules may be provided in a hierarchical arrangement to facilitate the handling of optical signals with different wavelength spacings, as disclosed in the instant application.

It is well settled that to consider the subject matter "as a whole" in a §103 analysis affirmatively involves taking into account all of the limitations of a claim. Because neither the Tanaka nor the Kim reference discloses an optical signal de-interleaver having an architecture comprising a plurality of hierarchical levels with at least one optical signal de-interleaver module being disposed in each of the hierarchical levels, as recited in amended claims 1 and 13, the suggested combination of the Tanaka and Kim references does not render amended claims 1 and 13 obvious. Accordingly, the Applicants

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respectfully submit that the rejections of amended claims 1 and 13 and the claims dependent therefrom under 35 U.S.C. 103 are unwarranted and should be withdrawn.

The official action indicates that the Tanaka reference discloses the optical add/drop multiplexor of base claims 7 and 15, except for the optical signal interleaver. The official action further indicates that the Kim reference discloses an interleaver 100 (see Fig. 4 of Kim et al.), and that it would have been obvious to one of ordinary skill at the time the invention was made to combine the teachings of Tanaka et al. and Kim et al. The Applicants respectfully submit, however, that the official action does not take into account all of the limitations of amended claims 7 and 15, and therefore the rejections of amended claims 7 and 15 and the claims dependent therefrom under section 103 of the Patent Laws are unwarranted and should be withdrawn.

For example, the official action does not take into account the limitation that the optical signal interleaver has an architecture comprising a plurality of hierarchical levels with at least one optical signal interleaver module being disposed in each of the hierarchical levels, as recited in amended claims 7 and 15. The notion of providing an optical signal interleaver having a hierarchical arrangement of optical signal interleaver modules is

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described throughout the instant application, e.g., see page 11, lines 11-19, of the application.

The official action indicates that the Kim reference discloses at least one optical signal interleaver module disposed in each of a plurality of hierarchical levels comprising elements 100, 110, and 120 (see Fig. 4 of Kim et al.). The Applicants respectfully point out, however, that although the element 100 is described by Kim et al. as an interleaver, the elements 110 and 120 are not interleavers, but instead are described as respective de-multiplexors for de-multiplexing optical signals into different channels and then outputting them to the input terminals of a multiplexor (see paragraph 0020 of Kim et al.).

Because neither the Tanaka nor the Kim reference discloses an optical signal interleaver having an architecture comprising a plurality of hierarchical levels with at least one optical signal interleaver module being disposed in each of the hierarchical levels, as recited in amended claims 7 and 15, the suggested combination of the Tanaka and Kim references does not render amended claims 7 and 15 obvious. Accordingly, the Applicants respectfully submit that the rejections of amended claims 7 and 15 and the claims dependent therefrom under 35 U.S.C. 103 are unwarranted and should be withdrawn.

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In view of the foregoing, it is respectfully submitted that the present application is in a condition for allowance. Early and favorable action is respectfully requested.

The Examiner is encouraged to telephone the undersigned Attorney to discuss any matter that would expedite allowance of the present application.

Respectfully submitted,

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